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SPERM STUDIES AS A GUIDE IN FUR-ANIMAL BREEDING PRACTICE

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Increasing Breeding Efficiency by Sperm Smears

Microscopic examination of material withdrawn from the vagina of a mink or fox is a valuable aid to efficient breeding practice. From such examinations the breeder can gage the likelihood of a productive mating, and from it he can detect sterile males. He is informed of conditions in time to correct the trouble and is therefore able to reduce the number of females not pregnant.

Material and Equipment

The following equipment is necessary for sperm study:

Compound microscope
  2 Objectives, 16X and 4mm.
  1 Ocular, 10X.
Spatula or small glass rod.
Substage microscope lamp.
Medicine dropper.
Glass slide.
Physiological salt solution.
Catching cage.

Assembling the Equipment

Inexpensive spatulas may be purchased or may be "home-made." To make a spatula, take a rod of cold-rolled steel or drawn steel about 1/4 inch in diameter and 9 inches long. Hammer both ends flat: the flattened portions should be about 1 inch long. Now grind or file the flat ends until they are a trifle narrower than the rod. Bend the tips upward and narrow the ends. Smooth the ends with fine sandpaper or emery cloth or buff on a wheel.

Another type of spatula can be made from a 6-inch length of No. 10 insulated wire. Choose wire with a solid core. Remove the insulation for 1-1/2 inches from one end. A nail with the head removed and similarly flattened and driven into a wooden handle can also be used. A glass rod 1/4 inch in diameter can be used if the end is smooth.

The physiological salt solution is prepared by taking a level teaspoonful of ordinary table salt and dissolving it in one pint of water. Use well water: do not use distilled or rain water because the minerals contained in well water are an essential part of the solution. A clean medicine dropper serves to transfer this solution to the slide. Tap water may be used if it is not chlorinated.

Clean some microscope slides. The common 1- by 3-inch slide is most convenient. After washing, rinse the slide well with plenty of clean, warm water, and then dry it. Old silk stockings, old pongee curtains, or old linen are best for the purpose as they polish the glass without leaving any lint on it. Have the microscope ready. It is wise to use a substage lamp, because it gives a uniform illumination and warms the stage of the microscope. Turn it on before the microscope is to be used.

Taking the Smear

The smear is best taken in a warm room--70° to 90° F. Excessive cold or heat will stop the movement of even the most vigorous sperms. If the work must be done where the temperature is low, have the salt solution warmed to a little above blood heat, which is approximately 100° F. Warm the slide before putting the drop on it, and have the substage lamp under the microscope.

After the male and female have separated, catch the female. It has been found that a cage with a movable bottom is best for the capture, for the animal must be held firmly. Raise the bottom until the animal is caught between top and floor; then place a board in front of her to prevent her crawling along the floor. The base of the tail should be at the level of the end of the catching cage. Now open the end gate of the cage and take firm hold of the tail. This hold is important, for to elevate the tail it is necessary to keep the animal from crawling forward. A net may be used for catching, and the animal held by an attendant.

Using the medicine dropper, transfer a drop of the physiological salt solution to the middle of a slide, dip the spatula into this drop, then gently insert the wet spatula into the vagina. Do not insert more than 1 inch. When inserted, give the spatula a quarter turn and remove. Now immerse the tip of the spatula in the drop of solution on the slide to transfer all the material removed from the vagina. The tip of the spatula is then washed in ordinary water and wiped dry, so it will be ready for the next animal. It will be well to dip the spatula in a mild disinfectant before washing. If this is done, be sure to rinse well, as any disinfectant left on the spatula would kill the sperms. Be very gentle in taking the smear; it is not necessary to scrape the sides of the vagina.

Interpretation of the Findings

As soon as the material from the vagina is transferred to the drop of salt solution on the slide, the preparation is ready to examine for live sperms. Place the slide under the microscope and focus. For routine examination involving only a quick look for motile sperms, a standard student microscope with a 10X ocular and 16 mm objective is used. This combination gives a fairly large field with considerable depth of focus, so that no cover glass is necessary. Higher power with cover glass is used for more careful study.

Because of the rough and tumble that usually accompanies copulation in minks it is not always possible to know whether the male organ has entered the vagina. Sometimes the organ is withdrawn before ejaculation of semen. In either case the smear taken from the vagina fails to show either sperms or any of the fluids released. Only the usual vaginal cells are present if the male either fails to introduce the organ or, having gained intromission, fails to deposit semen. Other smears will contain all of the accessory fluids that are released at ejaculation but no sperm.

Lack of sperm may be temporary or permanent. Experience indicates that spermless smears may be encountered frequently at the beginning of the breeding season. A male that has this type of smear early in the season may later on be an excellent sire. Still other smears contain only dead or abnormal sperms. Abnormal sperms may lack tails, have broken tails, or the heads may be misshapen. If a given smear can be assigned to any of the types here described, it is wise to breed again at once, otherwise, pregnancy will not result. Since a certain percentage of abnormal sperms is always found, do not discard a male unless the abnormal sperms exceed 20 percent.

If live sperms are present, they will be seen in numbers, their vibrating tails presenting an unmistakable picture. Even at microscopic powers too low to enable one to see much detail, the movement of live sperms is easily detectable. The normal secretions in the vagina tend to kill sperms, so if the mating has lasted for an hour or more most of the sperms recovered will be dead. As soon as conclusions have been reached, the slide can be cleaned for further use.

If the slide is to be preserved for later detailed study, it is allowed to dry. Dry slides can be shipped to a laboratory for preparation and study. Such a study is not practical for fur breeders, since technical training is required. Laboratory methods, therefore, will not be described here.

Examination of smears taken immediately after the animals separate will disclose unsuccessful matings. Detecting them early will allow time to breed again before the season is over. Males that fail repeatedly to deposit sperms can be eliminated as sterile. By following this method, the number of missed pregnancies may be reduced and much labor saved.